



# PATENT SPECIFICATION

593,237

Application Date: March 2, 1946. No. 12866/45.

Complete Specification Accepted: Oct. 13, 1947.

## COMPLETE SPECIFICATION

### Tack Driving Machine

We, EVERARD GEORGE SHANKLE, of 197, Langside Road, Glasgow, S.2, and PHILIP ROSE, of 3, Struan Avenue, Giffnock, Renfrewshire, both of British Nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to a tack driving machine of the type in which interconnected tacks in a string are fed automatically into position to be impacted by a hammer by means of which they are driven home.

15 A tack driving machine of the type referred to according to the invention includes a hammer consisting of a plunger urged towards the tacks by a spring and provided with a circumferential groove engageable by a sear connected through a bell-crank and toggle joint with an actuating lever, said sear being engageable with a fixed projection at a position near the end of its movement whereby the sear is withdrawn from engagement with the groove, thus allowing the plunger to be impelled against the tacks by the spring, feeding mechanism consisting of a wheel bearing around its periphery projections penetrating the spaces between the heads of interconnected tacks, said wheels being urged to rotate and feed forward the tacks by the engagement of a pawl with the projections, said pawl being actuated from the bell-crank, backward rotation of said wheel being prevented by the engagement of a second pawl with said projections, and means for preventing further operation of the machine when coming near the end of the string of interconnected tacks.

20 The tacks may be carried by a longitudinally slotted strip, the shanks of the tacks penetrating the strip between the slots, or the tacks may be secured as by soldering to a wire passing under the heads of the tacks.

25 The magazine is desirably so related to the path of the plunger that the strip or wire carrying the tacks in the last stage

of its movement will move in an approximately horizontal path in the direction from the magazine to a point beneath the hammer. The tacks are fed forward one 55 at a time on operation of the lever a distance slightly exceeding the diameter of the head of a tack. Guide springs hold each tack in co-axial relation with the plunger during the driving operation. 60

In operation, the lever is actuated and moves the feed wheel to feed a tack beneath the hammer while at the same time compressing the spring. By action of the sear the plunger is released to 65 effect its impact under the action of the spring and to drive home the tack through the guide springs, the lever being allowed to return to its initial position ready for a new operation. Simultaneously with 70 the driving home of a tack the strip or wire is sheared.

In lieu of a slotted strip there may be used plastic connections between adjoining tacks. 75

A practical embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a side elevation of the machine, Fig. 2 is a front elevation, Fig. 3 is a plan view, Fig. 4 is 80 a side elevation partly in vertical section and Fig. 5 is a section through XX in Fig. 4.

In the figures, 1 is the magazine, 2 is a slotted strip holding tacks 3; 4 is a solid 85 plunger slidable in a tube 4<sup>1</sup> and acting as a hammer impelled downwards by a spring 5. A pintle 6 slightly larger in diameter than the head of a tack is attached to the plunger 4 and is the part of the hammer 90 which actually comes into contact with the head of the tack. A circumferential groove 7 in the plunger 4 is engageable through a slot in the tube 4<sup>1</sup> by a sear 8 pivoted at 9 to one arm 10 of a bell-crank 95 lever 11 pivoted at 12 to the frame of the machine, said sear being urged into engagement with the groove 7 by a spring 12<sup>1</sup>. The other arm 13 of the bell-crank lever 11 is pivoted at 14 to a link 15 100 pivoted at 16 to another link 17 pivotally attached to the frame at 18. A link 19

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is connected at one end to the pivot 16 and at the other end is pivoted at 20 to an actuating lever 21, the links 15, 17 and 19 forming a toggle. The lever 21 is pivoted 5 at 22 to a handle 23 rigidly fixed to the tube 4<sup>1</sup>. A projection 24 on the tube 4<sup>1</sup> is adapted to engage the sear 8 at the top of its travel and push it clear of the groove 7 in the plunger 4, thus allowing 10 the plunger 4 to be forced downwards under the influence of the spring 5.

The strip of tacks is fed forward by a feed wheel 25 furnished with projections 26 around its periphery, said projections 15 being arranged to engage the heads of the tacks on the strip 2, whereby rotation of the wheel 25 will feed the strip of tacks forward, unwinding the coil of strip.

Rotational movement of the wheel 25 20 is effected by a pawl 27 adapted to engage the projections 26 on the wheel 25, said pawl 27 being mounted at the free end of an arm 28 pivotally mounted on the same shaft 29 as the feed wheel 25. A 25 pin on the arm 28 engages a slot 30 in one arm of a bell-crank 31, the other arm of said bell-crank being furnished with a pin 32 engaged by the arm 13 of the bell-crank 11 towards the end of its travel. 30 A spring 33 urges the arm 28 towards its initial position. A second pawl 34 prevents backward rotation of the feed wheel 25.

To give warning when the magazine is 35 empty, a bell-crank 35 is provided, said bell-crank being pivoted to the frame of the machine at 36. One arm of this bell-crank carries a narrow roller 37 arranged to bear on the heads of the tacks as they 40 come forward, the roller 37 being narrow enough to drop between the guiding strips 38 when there is no longer a tack head to support it. The other arm of the bell-crank 35 is adapted to engage an arm 39 45 spring-urged to take up a position perpendicular to the side plate 40 of the machine but normally prevented from doing so by the interference of the arm of the bell-crank 35.

50 A pawl 41 is arranged to hold each tack to be driven directly below the pintle 6.

Said pawl 41 also acts with the hammer to cut each tack off from the strip or wire as the tack is driven. The pawl 41 is 55 under the strip and as each tack is brought forward the shank of the tack pushes the pawl 41 out of the way. Said pawl 41 returns by spring action to its original position below the strip when the tack has 60 passed to its position ready for driving. The downward movement of the hammer 4 generates a shearing action between the edge of the pintle 6 and the edge of the pawl 41 and between the edge of the pintle 65 6 and the edge of the hole 41<sup>1</sup> into which

is pushed when the next tack is fed forward the loose end of wire or strip still attached to the said tack from the last tack driving operation. In this way when the hammer descends the strip or 70 wire is cut on opposite sides of the tack head, leaving the said tack with no protruding wires or pieces of strip.

Four guide springs 41<sup>2</sup> disposed in cruciform formation when viewed from 75 above are adapted to hold the shank of each tack while it is being driven, the springs flexing when the tack-head and hammer 4 come against them, thus allowing said tack-head and hammer to pass 80 beyond them.

Hinged doors 42 and 43 allow fresh strips of tacks to be inserted in the machine.

An adjustable plunger 4<sup>3</sup> is used for 85 regulating the initial compression of the spring 5, thus varying the power of the blow delivered by the plunger 4.

A spring 44 by its action between the lever 21 and the link 19 restores the mechanism to the starting position. 90

In operation, the machine is charged with a strip of tacks and, when the lever 21 is pulled upwards, the link 19 and the toggle formed by the links 15 and 17 rotate 95 the bell-crank 11 in clockwise direction, as seen in Fig. 4; the sear 8 in engagement with the groove 7 in the plunger 4 pulls the plunger 4 upwards against the spring 5. As the bell-crank 11 nears the 100 end of its travel the arm 13 engages the pin 32 on the bell-crank 31, rotates said bell-crank 31 in counter-clockwise direction; the slot 30 in the other arm of said bell-crank in engagement with the pin on 105 the arm 28 urges said arm 28 in clockwise direction; the pawl on the free end of the arm 28 in engagement with one of the projections 26 on the feed wheel 25 forces the feed wheel to rotate an amount equal 110 to the pitch of the projections on the periphery. The projections on the lower part of the feed wheel being in engagement with the heads of the tacks in the strip 2 feed a tack forward under the uprising 115 plunger 4.

As the sear 8 continues to pull the plunger 4 upwards, the said sear 8 comes into contact with the projection 24. The sear 8 is forced by said projection 24 out 120 of engagement with the groove 7, thus freeing the plunger 4 which is immediately forced downwards by the spring 5. The pintle 6 on the plunger 4 comes into contact with the tack directly beneath 125 it and forces the said tack downwards, shearing it or breaking it off from the strip 2 and driving it through the guide springs 41<sup>2</sup> into the material directly below. 130

Further manipulation of lever 21 will repeat the cycle of operation.

- When only a few tacks are left in the strip, and the last tack has passed below the roller 37, said roller drops, causing the bell-crank 35 to rotate in clockwise direction as viewed in Fig. 4. The other arm of the said bell-crank 35 moves away from the folding arm 39, which, under the influence of its spring, now takes up a position perpendicular to the side plate 40, thereby becoming a barrier in the way of the bell-crank 11, thus preventing the plunger 4 from being raised.
- 15 The machine described is a hand operated machine but it is to be understood that the machine can easily be adapted for power drive, e.g., electrically or by compressed air.

20 Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

- 25 1. A tack driving machine of the type referred to including a hammer consisting of a plunger urged towards the tacks by a spring and provided with a circumferential groove engageable by a sear connected through a bell-crank and toggle joint with an actuating lever, said sear being engageable with a fixed projection at a position near the end of its movement whereby the sear is withdrawn from engagement with the groove, thus allowing the plunger to be impelled against the tacks by the spring, feeding mechanism consisting of a wheel bearing around its periphery projections penetrating the spaces between the heads of interconnected tacks, said wheel being urged to rotate and feed forward the tacks by the engagement of a pawl with the projections, said pawl being

actuated from the bell-crank, backward rotation of said wheel being prevented by the engagement of a second pawl with said projections, and means for preventing further operation of the machine when coming near the end of the string of interconnected tacks.

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2. A tack driving machine as claimed in claim 1 in which a bell-crank is pivoted on a fixed pin, one arm of said bell-crank carrying a narrow roller arranged to bear on the heads of the tacks, the other arm 55 of said bell-crank normally holding a spring-urged arm in position clear of the bell-crank operating the plunger, the disposition of the mechanism being such that, when the last tack has passed from beneath the roller on the bell-crank, said roller drops, partly rotates the bell-crank and withdraws the other arm of the bell-crank from the arm which straightens out under the influence of its spring and takes 60 up a position in the way of the bell-crank operating the plunger whereby the machine is rendered inoperable.

3. A tack driving machine as claimed in claim 1 in which a pawl holds each 70 tack as it comes forward directly below the plunger and acts as a shearing edge.

4. A tack driving machine as claimed in claim 1 in which the initial compression of the spring which operates the plunger 75 is variable.

5. A tack driving machine as claimed in claim 1 and as described with reference to the accompanying drawings.

Dated this 28th day of February, 1946.  
CRUIKSHANK & FAIRWEATHER,  
29 St. Vincent Place, Glasgow, C.1,

and

29, Southampton Buildings, London,  
W.C.2,  
Agents for the Applicant.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1947.  
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which  
copies, price 1s. Od. each (inland) 1s. 1d. (abroad) may be obtained.

[This Drawing is a reproduction of the Original on a reduced scale.]

